

## 4.9 BIOLOGICAL RESOURCES

This section addresses all direct and indirect impacts expected to result from construction and operation of the alternatives for the NASA Ames Development Plan (NADP), including the No Action Alternative.

### *A. Standards of Significance*

Impacts on biological resources were determined to be significant if the project had the potential to:

- Substantially reduce the number or restrict the range of a special-status plant or animal species.
- Substantially adversely affect habitat for special-status plant or animal species.
- Substantially disturb biologically unique or sensitive natural communities (e.g., riparian systems, wetlands).
- Substantially interfere with the movement of any resident or migratory wildlife species, with established native resident or migratory wildlife corridors, or with the use of native wildlife nursery sites.
- Violates a law, code, or ordinance protecting or regulating special-status species.

### *B. Impacts Discussion*

This section analyzes potential impacts from each of the five proposed alternatives for development.

#### **1. Alternative 1: No Action Alternative**

Under Alternative 1, no new development beyond the baseline would occur in any of the planning areas. Current land uses in these areas would remain unchanged relative to the baseline. Any existing indirect impacts on biological resources would continue under Alternative 1. There would be no new direct impacts on biological resources under this alternative.

## 2. Alternative 2

Most of the parcels identified for development in the Bay View planning area under Alternative 2 are west of the OARF and are set back from the wetlands in the Bay View and North of Bay View areas. They are separated from wetland areas by a strip of open space approximately 30 meters (100 feet) wide (Bay View Parcel 11) that would serve as a buffer between developed areas and nearby wetland habitat.

East of the OARF, Alternative 2 provides for a 11-hectare (27-acre) burrowing owl preserve. The preserve was designed as part of NASA's Burrowing Owl Habitat Management Plan (BOHMP), which also includes a 9-hectare (22-acre) area in the NRP area, an 3-hectare (8-acre) site in the Existing Ames Campus area, and a 10-hectare (24-acre) area in the Eastside/Airfield area. In addition to protecting burrowing owl nesting habitat and foraging habitat, the preserves would also:

- Minimize impacts on other natural resources in the Bay View, Eastside/Airfield, and NASA Research Park areas.
- Buffer jurisdictional wetlands from the impacts of development, including light, glare and urban runoff.
- Provide foraging areas for other species such as golden eagles, and white-tailed kites.

The following sections address impacts expected to result from implementation of Alternative 2. Construction-related impacts (finite duration) are addressed separately from operations-related impacts (ongoing).

### a. Construction-Related Impacts

The following sections describe potential impacts from construction noise, runoff and operations.

#### i. Construction-Related Noise

Noise generated under Alternative 2 by construction equipment in the Bay View area might affect salt marsh common yellowthroats and white-tailed kites,

but is not expected to have an adverse impact on the North of Bay View area. California clapper rails have been reported in Stevens Creek and in Crittenden Marsh, approximately 1.3 kilometers (0.8 mile) and 0.7 kilometers (0.4 miles) north of the Bay View area, respectively.<sup>1</sup> This is far enough away that construction noise generated in the Bay View area would not be expected to substantially disturb these clapper rails or their habitat, especially given that noise would be temporary and of much lower volume than the noise from testing at the OARF. The potential impact of construction-related noise on all special-status species within Ames Research Center from development under Alternative 2 would thus be considered less than significant.

ii. Construction-Related Mortality of Special-Status Wildlife

Under Alternative 2, construction vehicles would have the potential to inadvertently injure or kill wildlife, including individuals of special-status species. Potential impacts to burrowing owl are discussed below. In the Bay View area, construction vehicles would also pose a hazard to salt marsh harvest mice. Occurrence of salt marsh harvest mice has been confirmed in the coastal salt marsh in the North of Bay View area.<sup>2</sup> However, coastal salt marsh habitat is not adjacent to the portions of Bay View planning area that are marked for development. Because of this distance between development and salt marsh harvest mouse habitat, and because construction vehicles are unlikely to need to drive on the roads surrounding coastal salt marsh, the potential for take of salt marsh harvest mice (as defined under the Endangered Species Act [(16 U.S.C. § 1531 *et seq.*); see discussion in Section 3.9) is considered extremely low. However, because of the extreme rarity of this species, this potential impact would be considered significant.

The long-legged myotis, yuma myotis, long-eared myotis, western mastiff bat, pallid bat, fringed myotis, and Townsend's big-eared bat are all bat species known to roost in buildings, and therefore could occur at Ames Research

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<sup>1</sup> CDFG, 2001 and Layne and Harding-Smith, 1995.

<sup>2</sup> Layne and Harding-Smith, 1995 and Pomeroy, 1991.

Center (Table 3.9-2). Destruction of a winter roosting or maternity site from the demolition or renovation associated with the implementation of the NADP, would be considered significant. However, none of these bat species have been observed at Ames Research Center.

iii. Impacts on Jurisdictional Wetlands from Construction Runoff

Alternative 2 proposes construction within the Bay View and Eastside/Airfield areas, both of which are adjacent to extensive jurisdictional wetlands (see Figure 3.9-3). Runoff from construction sites could decrease water quality of these wetland communities. Thus implementation of Alternative 2 could result in indirect adverse impacts on adjacent wetlands if runoff from construction sites entered the wetlands. Because of the size and proximity of the proposed development to sensitive habitats, this impact would be considered potentially significant.

b. Impacts From Invasive Plant Populations Caused by Construction and Operations of the Proposed Action

Invasive non-native plant species have already substantially degraded some native habitats at Ames Research Center, including grasslands and seasonal wetlands. Species such as perennial pepperweed, periwinkle, yellow star-thistle, bristly ox-tongue, ripgut brome, and wild oats now dominate some habitats once dominated by native species, and these invasive non-native species have the potential to continue to spread. Further development at Ames Research Center, especially in the Bay View area, could increase the potential for the introduction of additional invasive non-native species as a result of improper selection or handling of landscaping or erosion-control materials. For example, hay bales used for erosion control might contain seeds of invasive weedy species. Construction equipment could also introduce weed seeds in dirt and debris carried from other areas. In addition, people using the trails surrounding native habitats could inadvertently spread invasive weed seeds on their clothes or shoes. This potential impact would be considered significant.

c. Operations-Related Impacts

The sections that follow describe potential impacts from the continuing operations of new development proposed under Alternative 2.

i. Increase of Predator Populations at Ames Research Center

New development at Ames Research Center would increase the number of employees on-site. This in turn would increase the chances that people would release cats into the sites or establish unauthorized feeding stations for feral cats and other predators. The populations of predators would thus increase, and with them predation on native species, especially ground-nesting birds and the special-status birds, such as the burrowing owl, discussed under Alternative 1 (No Project Alternative). This indirect impact would likely be particularly pronounced in the Bay View area because of the proximity of proposed development in this area to native habitats. This impact would be considered potentially significant.

ii. Loss of Foraging Habitat for Raptors

Raptors typically require hundreds of acres of grassland to forage successfully for small mammals and birds. Development proposed for the Bay View and Eastside/Airfield areas under Alternative 2 would reduce the amount of grassland and open space available as foraging habitat for raptors such as the golden eagle, white-tailed kite, northern harrier, and American peregrine falcon, and would also decrease the prey base for these species on Ames Research Center. Implementation of Alternative 2 could result in the loss of as much as 18 hectares (44 acres) of raptor foraging habitat, including non-native grasslands, seasonal marsh transition, and weed-dominated areas. However, the majority of this habitat (non-native grasslands and weed-dominated areas) is of low to moderate quality. In addition, extensive areas of grassland and seasonal wetland would be preserved in the Eastside/Airfield area and in the North of Bay View area. Suitable raptor foraging habitat is also present near the Bay View area at Shoreline at Mountain View Regional Park and at the Palo Alto Baylands. The amount and quality of habitat lost as a result of implementing Alternative 2 would be small compared to the amount

of foraging habitat available in the vicinity. Thus, this impact would be considered less than significant.

iii. Loss of Jurisdictional Wetlands

The wetland delineation was verified by the Army Corps of Engineers (Corps) in May 2001, and is included in Appendix E of this document. Some of the seasonal wetlands identified in the Bay View area in the preliminary wetland delineation were eliminated from the final verification based upon the human-induced ponding mechanism that, when removed, also removed wetland indicators from the ponded areas. Thus, the total area of verified wetlands near the Bay View area 2.1 hectares (5.3 acres) was less than those identified in the preliminary delineation 2.2 hectares (5.5 acres).

After the verification, NASA altered the boundary of the Bay View area to avoid direct impacts to wetlands as a result of implementing the proposed action. These changes were not reflected in the Draft Programmatic EIS, but are incorporated into this Final Programmatic EIS.

iv. Effects of Increased Stormwater Runoff from Impermeable Surfaces on Sensitive Habitats

Construction of new buildings, roads, and parking lots within the Bay View area under Alternative 2 would increase the extent of impermeable surfaces in this planning area, potentially increasing stormwater runoff into adjacent habitats. Runoff from constructed impermeable surfaces might contain oil, grease, pesticides, fertilizers used on landscaping, and other pollutants typically found in urban areas. If contaminated runoff were to enter the sensitive and high-quality wetland habitats in the North of Bay View area, the pollutants it contained could adversely affect these habitats and the special-status species known or suspected to occur there, including salt marsh harvest mice, salt marsh common yellowthroats, and white-tailed kites. Moreover, additional freshwater inputs to the wetland habitat in the North of Bay View area could alter plant and animal species composition and flood sensitive habitat. This impact would be considered potentially significant.

NASA studied this potential impact in the Biological Assessment for the NADP, and found that only small changes would occur in the amount of freshwater runoff entering the Eastern Diked Marsh (EDM) and the SWRP as a result of development foreseen under Alternative 2. Consequently, substantial changes to the plant and animal communities in these wetland areas are not expected. Additionally, discharges to the Western Diked Marsh (WDM) would not be substantially increased or decreased under Alternative 2 relative to baseline conditions, so no significant impacts to wetlands are expected.

v. Impacts on Nocturnal Species Caused by Increased Lighting

Many mammals, amphibians, and some birds (e.g., western burrowing owls) are active at night. Lighting along roads and buildings in the proposed development areas might impact these species by disrupting their movements, breeding, or other behaviors. Habitat that is currently suitable for these species might be rendered unsuitable for some species if it were artificially lit at night. However, lighting might benefit other species within the planning areas. For example, night lighting might attract more nocturnal insects to the area, increasing available food for insect-feeding birds such as western burrowing owls.

The impact of increased lighting resulting from proposed development in the NRP and Eastside/Airfield areas would not be considered significant because of the extensive development and lighting already present in those areas. The impact of increased lighting in the Bay View area would be considered potentially significant because of this area's proximity to sensitive seasonal wetlands in the North of Bay View area.

vi. Effects on Wildlife of Increased Traffic Generated by Development

Development of increased office and laboratory space in all planning areas under Alternative 2 would increase the daily volume of vehicle traffic at Ames Research Center. Increased traffic might increase traffic-related disturbance of wildlife on-site, and would almost certainly increase the chance of collisions between wildlife and vehicles. However, potential effects on wildlife other

than burrowing owls, which are addressed below in Section 4.9 B.2.d., are expected to be minor because special-status species are generally located in areas that are some distance from high-traffic areas. In addition, non-special status wildlife located in the Bay View and North of Bay View areas are already accustomed to disturbances from existing traffic. This impact is therefore considered less-than-significant.

vii. Loss of Upland Habitat Adjacent to Marsh Areas

All or most of the development proposed under Alternative 2 would occur in upland habitat such as non-native grasslands and weed-dominated areas. Development in the Bay View area would reduce the extent of upland habitat directly adjacent to marsh habitats, thus decreasing the area of potential habitat for Alameda song sparrow, salt marsh common yellowthroat, tricolored blackbird and horned lark. However, the majority of upland habitat currently used by these species would be left intact, and development would remove only the lowest-quality habitat used by these species (i.e., habitats dominated by non-native and weedy species). Thus, this impact would be considered less than significant. Burrowing owl habitat preservation is addressed below.<sup>3</sup>

viii. Impacts to Western Pond Turtle and/or Their Habitat as Result of Changes to the Storm Water Drainage System

Changes in the storm water drainage system could impact western pond turtles by allowing polluted waters to enter the Northern Channel. The storm water system would include filtration structures designed to ensure that the quality of water pumped out of NASA Ames does not change from current or existing conditions. Because of the water filtration system, the water quality in the Northern Channel is not expected to be changed by the NADP. Therefore, there would be no expected impact to the western pond turtle.

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<sup>3</sup> Trulio, L. *Burrowing Owl Habitat Management Plan*, March 2001. Prepared for PAI Corporation and NASA Ames Research Center.



d. Potential Impacts on Burrowing Owls

This section describes seven potential impacts to burrowing owls from development proposed under Alternative 2. These impacts would be mitigated as much as possible by implementation of the BOHMP, described in greater detail in Chapter 2.

i. Loss of Birds

Development of burrowing owl habitat could cause bird mortality if burrows were destroyed while birds were underground. Most of the proposed development would occur in areas that do not currently provide owl nesting habitat. However, development is planned for a portion of owl habitat located between Hangar 1 and the NRP Preserve (NRP Parcel 19 on Figure 2.2), where up to three pairs of owls have typically nested in the past. This area, composed of NRP Parcels 7 and 8, is the only portion of the site where this impact could occur unless owls moved into other areas that are proposed for development. Because owls are protected by the federal Migratory Bird Treaty Act (16 U.S.C. § 703-712 *et seq.*) and California regulations, loss of any animals would be significant. Therefore, this impact would be considered potentially significant.

ii. Loss of Nesting and Foraging Habitat

Ames Research Center has established Burrowing Owl Nesting Habitat Preserves in each of the four planning areas. Moreover, NASA has identified other areas, not designated as Preserves, which currently provide burrowing owl nesting habitat (Figure 3.9-2). No development is proposed in any of these areas except in NRP Parcels 7 and 8. Consequently, most of the potential impacts to owl nesting habitat have been avoided. However, the loss of nesting habitat in NRP Parcels 7 and 8 would be considered a significant impact.

In the Ames Campus area, NASA is planning to create a softball field in the area just north of the 40- by 80-Foot Wind Tunnel. This area has often supported one or two pairs of nesting owls. The proposed use would be considered compatible with the existence of burrowing owls on the site as long as owl habitat was planned as part of the ballfield, and the ballfield was maintained in a manner that supported owl foraging and nesting.

Consequently, the impact of creating a ballfield in this area would be considered less than significant.

Besides nesting habitat, owls require large grasslands for foraging. Under baseline conditions, approximately 362 hectares (893 acres) of foraging habitat exist at Ames Research Center: 178 hectares (440 acres) of upland grassland, 50 hectares (123 acres) of recreational fields, and 134 hectares (330 acres) of wetlands. Approximately 12 hectares (28 acres) of upland grassland would be developed in Bay View (Parcels 1, 2 and 3). Approximately 4.5 hectares (11 acres) of land (Parcels 4 and 5) would be used as recreation fields. . Because the loss of foraging habitat would be small compared to the amount available, and because foraging habitat is available nearby to the areas that would be developed, this impact would be considered less than significant.

#### iii. Disturbance to Burrows

Project construction might result in short-term, temporary impacts to owl burrows. Construction in some areas, particularly in the NRP and the Ames Campus areas, might occur within 49 meters (160 feet) of owl burrows during the non-nesting season and within 76 meters (250 feet) during the nesting season. This short-term impact would be considered significant.

Long-term, permanent burrow disturbance might occur as a result of more development next to owl habitat. More people would be likely to walk or ride through sensitive owl nesting areas. There would also be significant increases in public access and traffic. The number of people expected to visit public attractions associated with the new development has not yet been quantified, but these people would provide additional pressure on nesting and resident owls. Visitors might also bring dogs to walk in the open fields where the owls nest. These long-term impacts would be considered potentially significant.

#### iv. Increased Vehicle Collisions

With development under the NADP would come more vehicle traffic. More employees, visitors and delivery needs would add more vehicles to the roads and increase the likelihood of burrowing owl mortality due to vehicle

collisions. Since owls are most active at night, the risk to owls is especially great from dusk on. This would be a potentially significant impact.

v. Control of Ground Squirrels

When sites are developed, landscaping is often managed to keep it free of ground squirrels. In addition, ground squirrel eradication may be implemented in open areas near new development because the squirrels are considered unsightly and a nuisance. However, an active ground squirrel population is an important element of owl preservation efforts. Because these colonial rodents are critical to the survival of burrowing owls in the South Bay, elimination of squirrel colonies could be a significant negative impact to burrowing owls. In addition, poisons used to kill squirrels might potentially kill burrowing owls, which would clearly be a significant impact.

vi. Decreased Prey Base

Building and grounds managers of new buildings might want to eliminate local rodents and insects on and adjacent to the development. The burrowing owls' prey base of small rodents (mice and voles) and insects would decrease if control methods were used in or near their habitat. This type of land management would have negative impacts on owl survival and reproduction. These impacts would be considered potentially significant.

vii. Increased Predation

New development under the NADP could increase the population of predators by planting new trees and installing light poles that provide perches for birds of prey, and by increasing the population of people feeding feral cats. This could have a significant impact on burrowing owl populations at Ames Research Center.

### 3. Alternative 3

Alternative 3 proposes new development in the NRP and Eastside/Airfield areas only.

Under Alternative 3, impacts would be similar to those described for Alternative 2 in the NRP and Eastside/Airfield areas. Impacts in the Bay View area would be minimized since no development would occur there.

As under Alternative 2, construction vehicles in the NRP area could affect western burrowing owls under Alternative 3. However, the increase in the number of workers present at Ames Research Center would be substantially less under Alternative 3 compared to that under Alternatives 2 or 4. Therefore, Alternative 3 would result in only a slight increase in the chance that additional workers would feed feral cats and other non-native predators.

#### **4. Alternative 4**

Like Alternative 2, Alternative 4 provides for open space between proposed development in the Bay View area and wetland habitat to the north. Although relatively narrow, the open space would buffer the wetlands from potential indirect impacts of development, including light, glare, and urban runoff. Alternative 4 also includes plans for the creation of burrowing owl preserves in the NRP, Ames Campus, and Eastside/Airfield areas. However, no burrowing owl preserve would be created in the Bay View area. This would reduce the amount of habitat in the Bay View area for burrowing owls in particular, but also decrease the area of foraging habitat provided for other species and the habitat available for buffering wetlands from urban runoff and other indirect impacts related to development. This impact is considered significant.

As discussed in Alternative 2, NASA altered the footprint of development for Alternative 4 based upon the results of the wetland delineation to ensure that no direct impacts would occur from the implementation of the proposed action. These changes are reflected in the analysis of Alternative 4.

#### **5. Alternative 5**

Alternative 5 proposes development in the NRP, Eastside/Airfield, Ames Campus and Bay View areas. The proposed action is not expected to result in

take of any federally-listed fish or wildlife species. No federally-listed plants are known or expected to occur in the areas affected by the proposed action.

Alternative 5 would avoid impacting the jurisdictional wetlands that occur on-site. All of the impacts discussed for Alternative 2 would also apply to Alternative 5, but to a lesser extent because Alternative 5 proposes less development in biologically sensitive areas, providing a greater buffer between proposed development and sensitive habitats and wetlands. Moreover, the parcels identified for development under Alternative 5 are set back from the wetlands in the Bay View and North of Bay View areas.

West of the OARF, parcels slated for development are separated from the wetlands by a strip of open space approximately 30 meters (100 feet) wide (Parcel 11) that would serve as a buffer between developed areas and nearby wetland habitat. In Mitigated Alternative 5, the Preferred Alternative, the setback has increased to 61 meters (200 feet). Alternative 5's proposed open space designation for the parcels adjacent to the burrowing owl preserve (Parcels 10, 6, and 7) would provide improved buffering for both the preserve and the wetlands in the east portion of the Bay View area. Open space proposed for Parcels 8 and 9 under Alternative 5 would also buffer the Bay View wetlands.

Implementation of the proposed burrowing owl preserve and open spaces would secure large areas of grassland and ruderal habitat. This would serve the primary purpose of protecting western burrowing owl nesting and foraging habitat, and would also (1) provide foraging habitat for raptors and other grassland species, (2) protect adjacent wetlands, and (3) minimize impacts on sensitive natural resources, as discussed above for Alternative 2. Specific impacts that would be minimized include light (glare), urban runoff, and construction-related impacts.

As discussed in Alternative 2, NASA altered the footprint of development in Alternative 5 based upon the results of the wetland delineation to ensure that no direct impacts would occur from the implementation of the proposed

action. Although these changes were not included in the Draft Programmatic EIS, they are reflected in this Final Programmatic EIS.

Seasonal wetlands located between the runways in the Eastside/Airfield area would not be affected by development proposed under Alternative 5. In addition, wetlands and waters of the United States along the North and East Patrol Roads and Marriage Road would be buffered from development by the burrowing owl preserve (Parcel 7) and open space on Parcel 8 (the golf course).

The increase in the volume of storm water to be generated from the implementation of this action is expected to be only 4 percent of average annual flows into the SWRP. Because most, if not all of the storm water is expected to be contained on site, the increase in water that may be pumped into Stevens Creek would be much less than 4 percent. When compared to the amount of water normally flowing in Stevens Creek, the addition of this small amount of water from the SWRP is not expected to impact creek volumes.

No effect is expected to the water quality of Stevens Creek from the increase in pumping into the creek. Swales and other water filtration mechanisms have been incorporated into the design of the storm water drainage system to maintain high water quality in the SWRP. This, in turn, regulates the quality of the water that supplies habitat for wildlife and/or may be discharged into Stevens Creek.

There is also no change expected to water temperatures in Stevens Creek from the increased pumping. The temperature of the still waters of the SWRP may have slightly higher temperatures than water flowing in Stevens Creek. However, as stated above, only a small amount of water (much less than 4 percent of runoff from Ames Research Center) would be discharged as compared to normal flows of Stevens Creek, and the discharge would occur only once or twice during the year. Therefore, any changes in temperature in Stevens Creek would be very small and highly localized to the discharge point of the water from the SWRP. In addition, the timing would be such that

anticipated high flows from the incoming storm would negate any temperature effects within a few hours.

Because of the maintenance of existing water volume, salinity, and quality in the eastern and western diked marshes and SWRP and the very small amount of discharge into Stevens Creek, no impacts to Stevens Creek, vegetation along the creek, or the sensitive species that occur there are anticipated. On April 23, 2001, the National Marine Fisheries Service (NMFS) indicated that the proposed project had no potential to affect fish species that are threatened, endangered, proposed, or candidates for listing.<sup>4</sup>

The remainder of the development proposed under Alternative 5 would take place in the Ames Campus and NRP areas. In these intensively developed areas, development would consist of infill and renovation of existing buildings, and would be similar to development proposed for these areas under Alternative 3. As discussed above for Alternative 3, the Ames Campus and NASA Research Park areas consist of weed-dominated, disturbed, and urban landscaped habitats. Western burrowing owls are the only sensitive species that would be impacted by development in these areas under Alternative 5.

## **6. Cumulative Impacts**

Ames Research Center is one of the few sites in the region that has both development potential and biological value. The cumulative projects listed in Chapter 2 would all occur on existing developed lands which have minimal potential to serve as biological resources. Thus there would be no opportunity for the cumulative projects to combine with the NADP to create additional cumulative adverse biological impacts.

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<sup>4</sup> Gary Stern and Brian Staab, personal communication, citation in Biological Assessment (Appendix E).

Past impacts on biological resources from projects that have already occurred have been considerably greater than those predicted in this EIS from the NADP or the cumulative project list.

Before human settlement, the site of Ames Research Center supported large expanses of moist grassland, with small areas of riparian forest and willow groves near Stevens Creek and other creeks.<sup>5</sup> Further toward the bay, habitats changed to tidal marsh and tidal flat, including an intricate system of sloughs and drainage channels.

Over time, 83 percent of the original tidal marshes in southern San Francisco Bay have been converted to salt ponds. The moist grasslands on the current ARC site were filled and developed, and similar conversion occurred in the adjacent cities of Mountain View, Sunnyvale, and San Jose, as well as other bay area communities. Natural drainage channels were diverted and channelized, virtually eliminating historical sheet and channel flows of water from the Santa Cruz Mountains to the Bay. Thus, little of the original habitat found in the past is now available for native plants and wildlife. As a result, some of the species found only in these habitats have declined substantially and have been listed by the state or federal government as threatened or endangered. Examples include the salt-marsh harvest mouse and California clapper rail, which are described in Section 3.9. These habitats may increase in the future as salt ponds and other areas are “reclaimed” for their historic habitats.

Cumulative loss, fragmentation and isolation of grassland in the region has adversely impacted western burrowing owls by reducing the amount of habitat available for nesting, foraging, and dispersal. In a 1996 survey of open grasslands in Silicon Valley that were occupied by burrowing owls in the early to mid-1980s, it was found that almost 60 percent of previously existing habitat

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<sup>5</sup> Goals Project. 1999. Baylands Ecosystem Habitat Goals. A report of habitat recommendations prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. First reprint. U.S. Environmental Protection Agency, San Francisco, Calif./S.F. Bay Regional Water Quality Control Board, Oakland, Calif.



had been developed.<sup>6</sup> Current development projects in the region such as Agnews Development Center and Mission College will have further adverse effects on burrowing owls.

Grasslands are also being lost rapidly throughout the U.S. as well. Analysis of breeding bird survey data from 1966 to 1996 by the Patuxent Wildlife Research Center found that grassland species showed consistent declines during this period. As this habitat is lost, species become rare. The western burrowing owl is one grassland species that is declining nationwide.

Habitat loss and owl-destructive management practices have reduced the owl population to a critically low level in Santa Clara County. As Santa Clara county experienced growth during the 1980s, approximately 60 percent of the burrowing owl population was lost during that decade.<sup>7</sup> DeSante and Ruhlem showed that the burrowing owl apparently has also been extirpated as a breeding species within last 10 to 15 years from Marin, San Francisco, Santa Cruz, and Napa counties. It has been very nearly extirpated from Sonoma, Santa Barbara, Orange and coastal San Mateo and Monterey counties.<sup>8</sup>

However, burrowing owls have also been found to adapt to some human landscapes and disturbance. Single owls and pairs can often be found in large parcels of vacant land in and around developed areas. Today, the South San Francisco Bay region, which includes Santa Clara and Alameda Counties, supports a population of approximately 120 pairs of burrowing owls. NASA Ames Research Center supports the largest subpopulation of burrowing owls in this region.

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<sup>6</sup> Trulio, 1998

<sup>7</sup> *Ibid.*

<sup>8</sup> Desante, D.F. and E. Ruhlen. *A Census of Burrowing Owls in California, 1991- 1993*. Institute for Bird Populations, Point Reyes Station, CA, 1995.

Ames Research Center is one of the only sites in the region that still maintains biological value for species that depend on wetlands near the bay and upland species such as burrowing owls. Proposed development at the Ames Research Center would avoid, or mitigate impacts to these sensitive habitats. In addition, the protection of the burrowing owls at Ames Research Center provided through implementation of the Burrowing Owl Habitat Management Plan (BOHMP) will ensure the continued conservation of this species in the proposed project area. With the inclusion of these measures, the NADP is not expected to significantly contribute to past cumulative impacts to sensitive species and habitats in the South Bay region.

### *C. Impacts and Mitigation Measures*

This section summarizes significant impacts identified in Section B, and proposes mitigation measures for each identified impact.

**Impact BIO-1:** Construction vehicles could inadvertently injure or kill individuals of special-status species or migratory birds. Because of the rarity of salt marsh harvest mouse (an endangered species), in particular, construction-related mortality could be a significant impact.

Applicable to: Alternatives 2 through 5, and Mitigated Alternative 5

Mitigation Measure BIO-1: To minimize the potential for injury or death caused by construction vehicles to western burrowing owls or migratory birds in all four planning areas and to salt marsh harvest mice in the Bay View area, the following components would be implemented:

- As much as possible, construction traffic would not be routed on roads adjacent to habitats where these special-status species occur and would be prohibited from using roads when habitat considerations require it.
- Occupied or potential habitat for these species near established routes would be marked as off-limits to construction vehicles.

- In the Bay View area, if construction vehicles must travel on roads within approximately 30 meters (100 feet) of occupied or potential habitat, drift fencing would be erected to prevent salt marsh harvest mice from crossing these roads. The drift fencing would be placed so that harvest mice retain access to adjacent upland habitats for use as refugia during high water events.
- All drivers of construction vehicles would be informed of the established vehicle routes and made aware of the importance of avoiding occupied and potential habitat for western burrowing owls and salt marsh harvest mice.
- Construction activities would not be allowed to disturb nesting migratory birds.

**Impact BIO-2:** There could be indirect adverse impacts if runoff from construction sites entered adjacent wetlands, decreasing water quality in these wetland communities.

Applicable to: Alternatives 2 and 4

Mitigation Measure BIO-2a: To minimize impacts on wetlands, construction would be avoided in the jurisdictional wetlands along the northern boundary of the Bay View area and within 30 meters (100 feet) of these wetlands. Fill activities and other disturbances would be minimized in jurisdictional wetlands elsewhere in the Eastside/Airfield area.

Mitigation Measure BIO-2b: A wetland enhancement plan would be developed for the restoration of functions and values of aquatic habitats in and adjacent to the Bay View area and outside of development area. This plan would include provisions to improve the quality of existing wetlands in the Bay View area through removal of invasive non-native plants such as periwinkle and perennial pepperweed. This enhancement plan would be developed in coordination with, and would be approved by, the US

Army Corps of Engineers and the Regional Water Quality Control Board prior to implementation of the proposed action.

All construction near or adjacent to wetlands would implement standard Best Management Practices to minimize runoff into these sensitive areas. Implementing grading and construction during the driest months of the year (July–October) would reduce the potential for siltation and runoff into surrounding habitats.

**Impact BIO-3:** Further development at Ames Research Center, especially in the Bay View area, could increase the potential for the introduction of additional invasive non-native species as a result of improper selection or handling of landscaping or erosion-control materials. In addition, people using the trails surrounding native habitats could inadvertently spread invasive weed seeds on their clothes or shoes.

Applicable to: Alternatives 2 through 5, and Mitigated Alternative 5

Mitigation Measure BIO-3: Landscaping would be designed with native species (with the possible exception of lawn areas). Invasive plants would not be used in any landscaping. Any imported soil used for landscaping must be certified as weed-free. Similarly, any erosion-control structures that contain hay or other dried plant material (e.g., hay bales) must be certified as weed-free. Any construction equipment operating within 76 meters (250 feet) of jurisdictional wetlands or other sensitive habitats in the Bay View area would be washed with reclaimed water prior to use in this area to remove potential weed seeds. The construction zone would be surveyed periodically by a qualified botanist, so that any infestations of invasive species that establish within the construction zone of the Bay View area can be eradicated before the plants can flower and set seed.

**Impact BIO-4:** New development at Ames Research Center would increase the number of employees on-site, with a corresponding increase in the potential for people to release unwanted cats and establish unauthorized feeding stations

for feral cats. The populations of feral cats and other predatory species would increase, and with it predation on native species, especially ground-nesting and special-status birds.

Applicable to: Alternatives 2 through 5, and Mitigated Alternative 5

Mitigation Measure BIO-4a: NASA and its partners would institute the following programs and policies to limit increases in predator populations:

- Prohibit employees from feeding wildlife, including cats.
- Institute and enforce a no pets policy in new housing.
- Install trash containers that cannot be opened by predator species.
- Augment the existing non-native predator control program, which includes humane trapping and removal of feral cats and other non-native predators, including, but not limited to, red fox, skunk, racoons, rats, and dogs.
- Conduct a public education program about the impacts caused by non-native predators and the need to refrain from feeding feral cats and other wildlife.
- A regular construction cleanup crew would be designated to ensure that construction debris and trash do not attract predators or scavengers.

Mitigation Measure BIO-4b: Design north and east fences bordering Bay View housing to eliminate movement of potential predators from the housing area to sensitive wildlife areas. The design would include:

- Burying the bottom portion of the fence at least 46 centimeters (18 inches) below ground level.
- Making the fencing grid size small enough to prevent rats from passing through.

- Placing roll wire along the top of the fencing to eliminate predators climbing over the fence and to deter avian predators from perching.

**Impact BIO-5:** Building-roosting bats may be disturbed by the demolition and renovation of existing buildings at Ames Research Center.

Applicable to: Alternatives 2 through 5, and Mitigated Alternative 5

Mitigation Measure BIO-5: To avoid impacts to roosting bats, a preconstruction survey of buildings to be demolished or renovated would be conducted by a qualified wildlife biologist in accordance with recommendations of the California Department of Fish and Game. If special-status roosting bats are found, CDFG would be consulted. An avoidance or mitigation plan would be developed and implemented. Avoidance measures could include construction outside of hibernation and maternal roosting time periods (winter), excluding bats from the buildings after they have left the roost to forage at night by closing entrances, and the construction of bat boxes to accommodate displaced bats. If bat boxes are used, NASA would monitor their success.

**Impact BIO-6:** An increase in the population at Ames Research Center would increase the amount of refuse that may be disposed of in and around buildings. Wildlife, especially feral cats and non-native predatory species, often forage in trash receptacles where food waste is disposed. This may result in an increase of these species in and around Moffett Field, which would increase predation on native species.

Applicable to: Alternatives 2 through 5, and Mitigated Alternative 5

Mitigation Measure BIO-6: NASA and its partners would use trash receptors that are animal resistant, and will maintain a regular garbage disposal schedule.

**Impact BIO-7:** Lighting along roads and buildings in proposed development areas in the Bay View area may impact wildlife species by disrupting their movements, breeding, or other behaviors.

Applicable to: Alternatives 2, 4 and 5, and Mitigated Alternative 5

Mitigation Measure BIO-7: NASA is conducting a lighting study to determine baseline levels. When feasible, nighttime lighting would be excluded in new development adjacent to high-quality wildlife habitat in the North of Bay View area. The Bay View housing would not be allowed to cause a net increase in lighting in the areas north or east of Bay View. The impacts of necessary lighting would be minimized by using low-glare light sources (e.g., low pressure sodium lighting) mounted on short poles and directed away from native habitats. In addition, light amplification to nearby sensitive areas would be eliminated through directional lighting with baffles, non-reflective tinting on windows, and other mechanisms.

**Impact BIO-8:** Removal of one hole of the golf course under Alternatives 2 and 4 would reduce existing habitat area for burrowing owls.

Applicable to: Alternatives 2 and 4

Mitigation Measure BIO-8: This impact would be mitigated by the creation of the burrowing owl preserve in the Eastside/Airfield area, which would be large enough to accommodate up to five pairs of owls. Thus any owls which would be affected by the removal of one hole of the golf course would have sufficient nearby habitat to relocate.

**Impact BIO-9:** Development on burrowing owl habitat could cause bird mortality if burrows were destroyed while birds were underground.

Applicable to: Alternatives 2 through 5, and Mitigated Alternative 5

Mitigation Measure BIO-9: NASA would:

- Protect owl burrows wherever possible through careful site planning and inspection during construction.
- Where burrows must be removed, evict owls outside the breeding season via passive relocation based on a plan developed by a qualified owl biologist.
- Replace lost burrows outside of the nesting season, before construction begins. Burrows would be replaced at a 3:1 ratio either within the owl preserves or in other suitable on-site habitat areas.
- Place a Habitat Conservation Easement over burrowing owl preserves.

**Impact BIO-10:** While NASA has taken steps to avoid most potential impacts to nesting habitat, new development would result in the loss of owl nesting habitat in NRP Parcels 7 and 8. In addition, development would cause the loss of some foraging habitat, especially in the Bay View area.

Applicable to: Alternatives 2 through 5, and Mitigated Alternative 5

Mitigation Measure BIO-10: NASA and its partners would:

- Establish a burrowing owl preserve in the NRP area which would prevent impacts to owls currently nesting within the future preserve area, and mitigate impacts to owls that might be disturbed by development on NRP Parcels 7 and 8. Restoration, including the removal of concrete, asphalt and other structures, and enhancement of the preserve in the NRP area sufficient to offset development impacts would occur prior to that development.
- Design landscaping in developed areas with low growing native vegetation to enhance owl use.
- Minimize the development footprint to the extent possible, and locate new development adjacent to existing development to minimize habitat fragmentation.



- Minimize construction impacts on nesting and foraging habitat by restricting the area available for circulation and staging of equipment.
- Manage other grassland areas at Ames Research Center to support owls and their prey.

**Impact BIO-11:** There could be short-term disturbances to existing burrows if construction occurred too close to the burrows. There could also be long-term disturbances caused by increased intrusion into nesting areas by new residents, employees, and visitors and their pets.

Applicable to: Alternatives 2 through 5, and Mitigated Alternative 5

Mitigation Measure BIO-11a: In order to minimize short-term disturbances from construction, NASA would adopt the BOHMP, which recommends the following:

- Construction near owl habitat would be scheduled outside of breeding season, which typically runs from February 1 to August 31, as much as possible.
- Construction would be kept as far from nesting areas as possible. If possible, NASA would maintain a minimum 49-meter (160-foot) buffer around occupied burrows during the non-nesting season, and a minimum 76 meter (250-foot) buffer during the nesting season.
- If it is not possible to maintain these distances, NASA would work with a qualified owl biologist to determine appropriate distances from active burrows, fence burrows off from construction activities, and provide owls the opportunity to move by installing artificial burrows further from construction areas before construction begins.
- NASA would work with a qualified owl biologist to find circulation routes, staging areas, and areas for other construction activities that will minimize impacts to owls or their burrows.

Mitigation Measure BIO-11b: In order to prevent long-term disturbances from increases in population associated with implementation of the NADP, NASA and its partners would:

- Fence off owl habitat with attractive fencing and low, native shrubs.
- Design paths around the perimeter of owl habitat to allow people to see the owls without disturbing them.
- Prohibit walkers, bikers, and dogs from moving through the habitat areas.
- Use signage to educate people about the owls and their sensitivities.
- Monitor habitat areas after construction, and implement further protective measures as needed.
- Restrict construction of roads, trails, pathways, and other development from occurring within designated burrowing owl preserves.

**Impact BIO-12:** Burrowing owls often fly fairly low to the ground, so increases in vehicular traffic as a result of new development would in turn increase the potential for owl/vehicle collisions.

Applicable to: Alternatives 2 through 5, and Mitigated Alternative 5

Mitigation Measure BIO-12: In order to minimize increases in vehicle collisions with burrowing owls, NASA and its partners would :

- Post 25 MPH speed limits along roads adjacent to owl habitat.
- Route traffic away from owl habitat as much as possible, especially at night.
- Plan new roads and other transportation corridors away from owl habitat wherever possible.
- Monitor traffic impacts to burrowing owls, and implement additional mitigation measures if necessary.

**Impact BIO-13:** Measures to control ground squirrels could negatively impact burrowing owls, which are dependent on the squirrels for a variety of functions.

Applicable to: Alternatives 2 through 5, and Mitigated Alternative 5

Mitigation Measure BIO-13: NASA would:

- Conduct no squirrel control in the owl preserves, and as little as possible in other owl habitat areas.
- Allow squirrels to inhabit areas around new development that will not be used by people.
- Work with a qualified owl biologist to develop an eradication plan that minimizes effects on burrowing owls if squirrels must be controlled.

**Impact BIO-14:** New development could decrease the owls' prey base if building managers eliminated the small rodents and insects that form the burrowing owls' prey base in developed areas.

Applicable to: Alternatives 2 through 5, and Mitigated Alternative 5

Mitigation Measure BIO-14: To protect the owls' prey base, NASA would adopt the BOHMP, which recommends the following:

- Allow small rodent and insect control only directly around buildings.
- Forbid the use of biocides adjacent to or within owl habitat.
- Limit, or if possible, prohibit the killing of small rodents or insects in the owl preserves, enhanced owl habitat, and any other areas where owls nest or forage.

**Impact BIO-15:** Proposed new development could increase the population of predators by planting new trees and installing light poles that provide perches

for birds of prey, by creating habitat for rodents, and by increasing the population of people, some of whom may feed feral cats.

Applicable to: Alternatives 2 through 5, and Mitigated Alternative 5

Mitigation Measure BIO-15: In order to prevent increased predation, NASA would enforce Mitigation Measure BIO-4, above. In addition, NASA and its partners would:

- Continue on-going efforts to control non-native predators in conjunction with US Fish and Wildlife.
- Limit tree planting along roads or buildings adjacent to owl and other wildlife habitat areas to minimize the increase in available perches for avian predators, and modify other potential perches structurally to discourage predators.
- Minimize outdoor lighting posts near burrowing owl and other wildlife habitat to reduce new perches for avian predators. Where lighting is needed for safety reasons, install devices to discourage birds from perching.
- Trees in Bay View adjacent to the Western Dikes Marsh would be from the USFWS approved list.
- Compensate for increases in predation by eliminating predator perches along and within the boundaries of the Western Diked Marsh, Eastern Diked Marsh and Storm Water Retention Pond.
  - " Place roll wire atop all fencing surrounding the eastern and western diked marshes and the storm water retention pond.
  - " Place anti-perch devices on and surrounding the Plant Engineering facilities at the northwest corner of ARC property.
  - " If feasible, remove all landscape features within these areas that provide perches for avian predators.

- If possible, avoid the use of rip rap on slopes resulting from fill of the Bay View housing area. If rip rap must be used, it must be small diameter materials that would not create habitat for rodents.
- Avoid placing rip rap on existing marsh vegetation.

**Impact BIO-16:** Alternative 4 would result in the loss of approximately 11 hectares (27 acres) of burrowing owl habitat in the Bay View Area.

Applicable to: Alternative 4

There is no mitigation measure available for this impact other than reconfiguring the alternative so that it would be more similar to Alternatives 2, 3 and 5. Thus, this impact would be significant and unavoidable for Alternative 4.

**Impact BIO-17:** Although the measures to reduce impacts to burrowing owls are expected to be sufficient to reduce impacts to less-than-significant levels, there can be no guarantee of this without monitoring of owl populations. If the measures were ineffective and owl populations decreased, a significant impact would occur.

Applicable to: Alternatives 2 through 5, and Mitigated Alternative 5

Mitigation Measure BIO-17a: NASA would monitor the burrowing owl population change at Ames Research Center – including changes in adult and pair numbers, changes in chick production, and general mortality factors – in relation to these parameters as measured for a reference owl population in Santa Clara County over a 3-year period. The reference population would be determined based on population dynamics research conducted by a qualified ecologist.

Mitigation Measure BIO-17b: If the Ames Research Center owl population or chick production (compared to the reference population)

experiences a significant drop, either statistically or in the opinion of a qualified owl biologist over a 3-year time period, NASA would implement these further actions:

- Hire a qualified owl biologist to determine if the population decline is due to human impacts from development in the NADP and to determine the sources of population decline due to development in the NADP.
- Implement actions and management activities designed by a qualified owl biologist to mitigate those sources of population decline and to return population levels to pre-NADP development levels.
- Continue monitoring owl population dynamics to determine if the mitigation measures have been successful at stabilizing the population and increasing the population to pre-NADP development levels. Measurements would be based on a 3-year time frame.

**Impact BIO-18:** There could be indirect adverse impacts if runoff from construction sites entered the existing storm drain system and the Storm Water Retention Pond.

Applicable to: Alternative 5 and Mitigated Alternative 5

Mitigation Measure BIO-18: Potentially contaminated runoff would be managed using stormwater BMPs. Swales would be constructed adjacent to wetlands in upland areas to intercept and filter any runoff before it reaches the wetland. Construction of swales would be permitted within the buffer zone around wetlands, but not within the wetlands themselves.

**Impact BIO-19:** There could be indirect adverse impacts if runoff from construction sites entered adjacent wetlands, decreasing water quality in these wetland communities.

Applicable to: Alternative 5 and Mitigated Alternative 5

Mitigation Measure BIO-19: To minimize impacts on wetlands, construction would be avoided in the jurisdictional wetlands along the northern boundary of the Bay View area and within the buffer zone of these wetlands. Fill activities and other disturbances would be avoided in jurisdictional wetlands elsewhere in the Eastside/Airfield area.

NASA AMES RESEARCH CENTER  
NASA AMES DEVELOPMENT PLAN  
FINAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT  
ENVIRONMENTAL CONSEQUENCES: BIOLOGICAL RESOURCES